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THE APPLICATION OF CORPORATE INVESTMENT TECHNIQUES TO REAL ESTATE EXPENDITURE ANALYSIS

THE most profitable utilization of real estate and investment funds is of prime importance to any investor. Highly developed competition, coupled with increasing price levels, has reduced profit margins and thus created a growing need for careful analysis of all capital expenditures planned by property owners and developers. A frequent investment problem is whether a particular improvement should be rehabilitated, modernized, remodeled or razed and replaced with a new structure. Often brought into the picture, depending on the scope of the problem, are the architect, the contractor, and the professional appraiser. In order to meet the increasing demands of their clients, these consultants must continually strive to absorb and develop new techniques which will enable them to expand the scope of their services. Whether the contemplated outlay involves the addition of modern plumbing facilities to a small apartment building or the installation of a bank of automatic elevators in an office building, a careful analysis must be made in order to determine the investor's return on his capital. This analysis often enables an investor to make a choice among several alternative capital expenditures.

The field of corporation finance is naturally preoccupied with the problem of computing rates of return on various capital investments. Writings in this field display a variety of methods and techniques of measuring investment worth. In this article we intend to present two systems of developing rates of return for contemplated capital expenditures. The two methods, the payback or payoff method and the discounted cash flow or capital recovery method, have been developed and refined by many authorities in the field of financial and managerial investment analysis. By means of a rather simple but practical example, we will attempt to develop these techniques as an appraiser-consultant might utilize them.

If the appraiser or counselor is faced with the task of evaluating a proposed capital expenditure the usual process is to carefully develop a "before expenditure - after expenditure" appraisal for the property under consideration. The first phase of an appraisal of this type involves determining the fair market value of the property before any additional capital outlay has been made. The resulting figure is termed the "before" value of the property. Next, the ap-

praiser must endeavor to estimate what the value of the improvement will be "after" the additional expenditure has been made. This entails an accurate estimate of the type, scope, and cost of the various renovation expenses combined with a projection of the increased benefits the property will be able to command. Besides increasing rentals, we realize that many capital outlays are made in an effort to enable a property to merely stay competitive, to avoid a rapid decline in rentals, to decrease vacancy, to reduce expenses, to extend economic life, etc. The preceding goals all serve to enhance the value of the owner's investment or they would not be worthy of even preliminary consideration.

Under most conditions the "after" value usually exceeds the "before" estimate. In practice, once these values have been derived, the difference between the two is obtained by simple subtraction. The actual cost of the added improvement is then deducted from the aforementioned difference. This results in an absolute dollar figure which represents the net incentive, if present, for making the capital expenditure. At this point, the appraiser must analyze the relationship between the capital outlay and the increased improvement value it produces. It is this analysis which we feel may be more highly developed by application of the payback or discounted cash flow methods of investment evaluation.

Assume that the "X" Corporation owns a large downtown office building. The management is considering the installation of a bank of modern automatic elevators in order to increase rentals and reduce elevator operator expenses. In order to simplify the problem, we will assume that the expenditure is not required in order to meet competition. The total cost of installation has been set by contractor bid at $500,000. Upon installation these elevators will be assumed to have an estimated life of 40 years. The additional annual income is estimated at $25,000 per annum, and the annual savings in operator expense will be $60,000. There will also be an increase in power expense of $3,000 per year. Now, without developing the entire "before-after" appraisal, we will illustrate two systems of developing rates of return for the contemplated capital expenditure.

THE PAYBACK OR PAYOFF METHOD

In its most elementary form, the payback technique is developed by dividing the net investment by the annual savings or earnings that result from the capital expenditure. The quotient produced by this division is termed the payback or payoff factor. It represents the number of years that are necessary for the earnings on the capital expenditures to pay back the cost of the original investment without benefit of interest. Simply, it tells the investor how fast he can recover his cash outlay.

The first step in applying the payback-payoff technique is to total the increased earnings and/or savings brought about by the expenditure, in this in-

stance automatic elevators. Step 1 in the accompanying analysis (Schedule I) shows this addition. Next (Step 2), any additional recurring cost incurred by installing the new elevators must be deducted in order to arrive at a net earnings figure before taxes and depreciation. At this point in the analysis the net earnings figure (before taxes and depreciation) could be processed by the procedures indicated in Steps 6 and 7, but three intermediate steps have been added to the analysis for your consideration.

Installation of the new equipment brings about an annual allowance for depreciation. In this era of high replacement costs, rapid technological changes, and complex tax regulations, investment decisions may be influenced to a great extent by factors such as depreciation, tax bracket, etc. In an effort to tailor an investment analysis to the needs of a particular client, we have extended the usual net earnings figures to include the effects of depreciation on taxes. Depreciation is assumed to be on a straight line basis for the 40-year expected life. This is a conservative approach and proper in an analysis of this type. In Step 3 we have deducted the annual depreciation attributed to the installation of the elevators from the net earnings before taxes and depreciation. Since the depreciation allowance is a noncash expense, deductible for tax purposes, it becomes a tax "cover" or "shield" that serves to protect earnings from the total effect of income taxes. Step 3, therefore, shows the taxable earnings attributed to the elevator expenditure. Since taxes in this illustration are paid on a corporate basis, 50 percent of the taxable earnings must be deducted as shown in Step 4. Although the corporate tax rate is 52 percent, a portion of corporate earnings is taxed at a lower rate. Therefore, we consider 50 percent a fair rule of thumb. Deducting the tax estimate from the taxable earnings figure, we arrive at an estimate of $34,750 in earnings after taxes.

The noncash depreciation expense should be readded (Step 5) to the earnings after taxes in order to ascertain the net annual earnings or payback divisor obtained by the "X" Corporation due to the installation of a bank of elevators. Simply, the adding back of depreciation at this point produces a net earnings figure before depreciation (but after taxes) for the "X" Corporation. In the payback or payoff analysis we are striving to determine the cash flow produced by an investment. This is the sum of actual earnings plus depreciation. The more rapidly these two elements build up to the original cost of the investment, the shorter the payback or payoff period. In the example we find that an annual earnings figure of $47,250 has been estimated within the corporation's tax structure. Dividing the total elevator cost by the annual earnings figure (Step 6), the payback or payoff period is obtained. This factor (10.6) is merely how many years it will take for the automatic elevator investment to generate enough cash to pay for itself. By dividing the 10.6 payback factor into 100 we obtain a rate of return on the "X" Corporation's automatic elevator investment of 9.4 percent. Thus, other factors being equal, the corporation officials must decide if 9.4 percent is a satisfactory return for its funds, or if a superior investment alternative exists.

SCHEDULE I

PAYBACK OR PAYOFF ANALYSIS OF AN AUTOMATIC ELEVATOR EXPENDITURE CONTEMPLATED BY THE "X" CORPORATION

Step 1:	Annual increase in net rental income	$ 25,000
	Annual savings on elevator operator expense	60,000
	Total	$ 85,000
Step 2:	Minus: Additional annual power cost	-3,000
	Annual earnings (before taxes and depreciation)	$ 82,000
Step 3:	Annual depreciation expense	12,500
	Taxable earnings	$ 69,500
Step 4:	Annual income tax (50% basis)	34,750
	Earnings after taxes	$ 34,750
Step 5:	Add back noncash depreciation expense	12,500
	Annual earnings to "X" Corporation	$ 47,250
	Cost of automatic elevators	$500,000
Step 6:	Derivation of payback factor: $500,000 ÷ $47,250	10.6
Step 7:	Investor's return 100 ÷ 10.6 payback	9.4

THE DISCOUNTED CASH FLOW OR CAPITAL RECOVERY METHOD

The discounted cash flow or capital recovery process is developed by finding the interest rate that will discount the future earnings of a particular capital expenditure to a present value which equals the investment's original cost. The interest rate that will accomplish this is designated the rate of return on the contemplated investment. Basically, this technique rests on the idea that an investor makes a capital outlay in order to purchase a series of future annual earnings. In the case of the elevators, these earnings amount to $47,250 per annum after taxes, but before depreciation. As in the payback method, we assume that the annual savings will be constant over the life of the elevators.

This technique, as demonstrated in Schedule II, involves the same preliminary steps used in the payback method. Once the annual earnings are computed, the rate is selected by trial and error. By scanning a table of present worth factors (present worth of 1 per annum) several factors at various interest rates are chosen. The factors picked are those which, if applied to the annual earnings figure, appear to approximate the original investment. By multi-

plying the annual earnings by the factors selected, a range of present values is derived (see Schedule II). The present value of the future earnings expected by installing the elevators which comes closest to the original cost of the expenditure ($500,000) determines which percentage can be designated as the rate of return. In this instance, it is 9 percent. The use of the present worth table is justified because the earnings from the elevator installation are expected to persist over the economic life ascribed to the equipment.

In our opinion, the major attribute of this process rests in its underlying assumption that when an investor is considering an outlay, he is in reality purchasing a series of future earnings. He has in effect an investment in each of the future annual earnings, which compounds in worth throughout the life of the investment. Properly displayed, this can be readily understood and effectively presented to clients concerned with various investment and renovation problems.

SCHEDULE II

DISCOUNTED CASH FLOW OR CAPITAL RECOVERY ANALYSIS OF AN AUTOMATIC ELEVATOR EXPENDITURE CONTEMPLATED BY THE "X" CORPORATION

Estimated Life	Annual Earnings	$8\frac{1}{2}\%$ Factor	Present Value
40 years	$47,250	11.314	$534,587
		Investment	500,000
		Variance	+34,587

Estimated Life	Annual Earnings	9% Factor	Present Value
40 years	$47,250	10.757	$508,268
		Investment	500,000
		Variance	+8,268

Estimated Life	Annual Earnings	$9\frac{1}{2}\%$ Factor	Present Value
40 years	$47,250	10.247	$484,171
		Investment	500,000
		Variance	-15,829

A major advantage of the discounted cash flow procedure is that it can be readily applied to projected earnings that will fluctuate from year to year rather than be constant. Schedule III, although not related to the elevator example, demonstrates this feature. We have assumed a capital expenditure of $8,000 will result in savings of $500 the first year, $1,500 the second and third years, $3,000 the fourth year, $5,000 the fifth year. This particular expenditure has an estimated life of five years with no salvage value. In this instance, a present worth of 1 table has been used. Application of the same principle used in developing Schedule II now produces the following trial and error analysis:

SCHEDULE III

Year	Savings	Present Value 9%	Present Value 10%	Present Value 11%
1st	$ 500	$ 459	$ 455	$ 451
2nd	1,500	1,263	1,240	1,217
3rd	1,500	1,158	1,127	1,097
4th	3,000	2,125	2,049	1,976
5th	5,000	3,250	3,105	2,967
		$8,255	$7,976	$7,708

We realize that the thoughts discussed in this article are controversial and require more testing before the acceptance or rejection of their usefulness in appraisal work can be determined. This article has been presented in keeping with our policy of exploring possible new methods and procedures and their adaptability to appraisal-consultation work.

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